

*Ch. Mayo*

COMMON STANDARD  
SPECIFICATION No. CS-110  
FOR  
9,000 GALLON  
RECTANGULAR TENDERS

*out*

INCLUDING  
PAINTING, LETTERING AND NUMBERING OF LOCOMOTIVES  
AND TENDERS TO ACCOMPANY SPECIFICATIONS  
FOR THE FOLLOWING CLASSES OF  
LOCOMOTIVES.

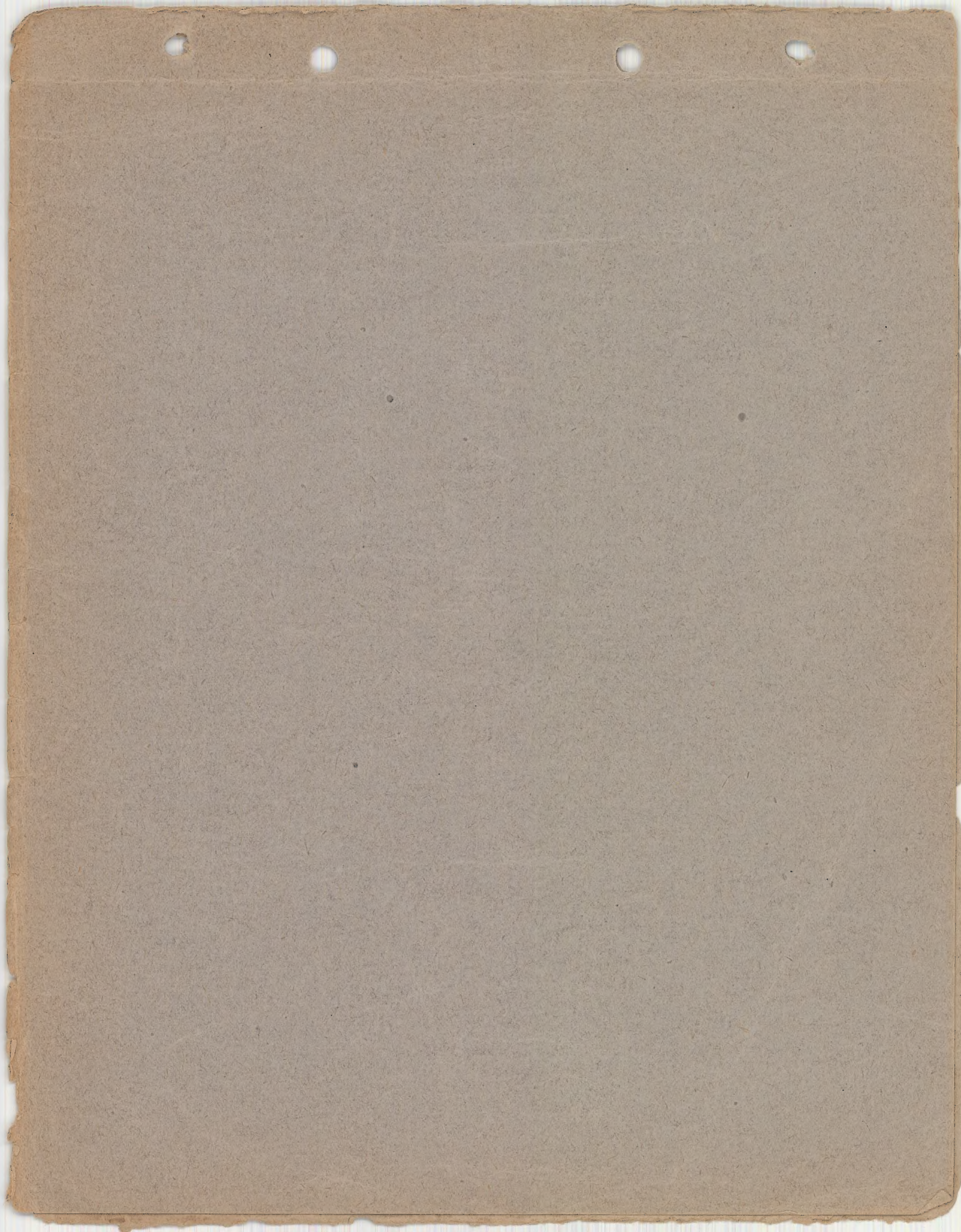
ATLANTIC TYPE - - - Class A-81  $\frac{20}{28}$  105.

PACIFIC TYPE - - - Class P-77  $\frac{22}{28}$  141.

ADOPTED JULY 19, 1905.

*Revised July 1 - 1906*







# COMMON STANDARD SPECIFICATION No. C. S. 110

FOR  $\square$

9000 GALLONS, RECTANGULAR TENDERS *out*

To accompany Specifications for following classes of locomotives :

ATLANTIC TYPE - - Class A-81  $\frac{20}{28}$  105.

PACIFIC TYPE - - - Class P-77  $\frac{22}{28}$  141.

ADOPTED JULY 19, 1905.

## GENERAL DESCRIPTION.

### General Design.

As shown on drawings

- C. A. 4351 Tender
- C. A. 4328 Tank (when coal is used as fuel)
- C. A. 4540 Tank (when oil is used as fuel)
- C. A. 4593 Tank (oil)
- C. A. 4331 Tender Frame
- C. A. 4335 Tender Truck

### Capacity.

9000 gallons water.  
10 tons coal, or ~~2835~~ gallons of fuel oil.

2487

### Weights with Tender Equipped for Coal.

Weight of tender empty .....	67,200 lbs.
Weight of 9000 gallons water .....	75,000 lbs.
Weight of 10 tons coal .....	20,000 lbs.
Total weight of tender loaded .....	162,200 lbs.
Weight of each truck .....	9,975 lbs.

### Weights with Tender Equipped for Oil.

Weight of tender without fuel and water .....	75,600 lbs.
Weight of 9000 gallons water .....	75,000 lbs.
Weight of <del>2835</del> gallons fuel oil .....	22,680 lbs.
Total weight of tender loaded .....	170,500 lbs.

19,700

2487

### Dimensions.

Wheel base .....	18'-10"
Height from top of rail to bottom of tank—loaded tender .....	4'-3 $\frac{1}{8}$ "
Height from top of rail to top of manhole—loaded tender .....	10'-10"
Height from top of rail to top of coal boards—loaded tender .....	11'-7 $\frac{1}{4}$ "
Width of tank—outside .....	10'-0 $\frac{1}{2}$ "



# COMMON STANDARD SPECIFICATION No. C. S. 110

FOR

## 9000 GALLONS RECTANGULAR TENDERS

To accompany specifications for following classes of locomotives:

ATLANTIC TYPE Class A-81 105

PACIFIC TYPE Class P-77 141

ADOPTED JULY 18, 1907

### GENERAL DESCRIPTION

As shown on drawings:  
 C. A. 4382 Tender Truck  
 C. A. 4381 Tender Frame  
 C. A. 4383 Tank (oil)  
 C. A. 4380 Tank (when oil is used as fuel)  
 C. A. 4322 Tank (when coal is used as fuel)  
 C. A. 4351 Tender

General Design

Capacity

9000 gallons water.  
 10 tons coal, or 2885 gallons of fuel oil.

Weights  
 Equipped for  
 Coal

Weight of tender empty..... 67,200 lbs.  
 Weight of 9000 gallons water..... 75,000 lbs.  
 Weight of 10 tons coal..... 30,000 lbs.  
 Total weight of tender loaded..... 182,200 lbs.  
 Weight of each truck..... 8,975 lbs.

Weights  
 with Tender  
 Equipped for  
 Oil

Weight of tender without fuel and water..... lbs.  
 Weight of 9000 gallons water..... 75,000 lbs.  
 Weight of 2885 gallons fuel oil..... 22,880 lbs.  
 Total weight of tender loaded..... lbs.

Dimensions

Wheel base..... 18'-10"  
 Height from top of rail to bottom of tank—loaded tender..... 4'-8 1/2"  
 Height from top of rail to top of manhole—loaded tender..... 10'-10"  
 Height from top of rail to top of coal boards—loaded tender..... 11'-7 1/2"  
 Width of tank—outside..... 10'-0 1/2"



## TENDER TRUCK.

<b>Design.</b>	Must be of arch bar type as shown on drawing C. A. 4335. Care must be exercised to see that all holes in arch bars, spring planks and column castings are drilled to templates to insure the arch bars and journal boxes being in perfect alignment when put together.
<b>Dimensions.</b>	Wheel base..... 5'-6" Height top of rail to contact surface of center plate—tender loaded..... 28 $\frac{3}{8}$ " Height top of rail to top of side bearing—tender loaded..... 31 $\frac{1}{8}$ "
<b>Arch Bars.</b>	Arch bars must be of wrought iron, double refined, in accordance with specification C. S. 6 and as shown on drawing C. A. 3151. Top arch bars must be 1 $\frac{1}{2}$ " x 5" section, set 5". Inverted arch bars must be 1 $\frac{1}{2}$ " x 5" section, set 13". Tie bars must be $\frac{5}{8}$ " x 5" section.
<b>Axles.</b>	Axles must be M. C. B. standard with 5 $\frac{1}{2}$ " x 10" journals, made of open hearth steel, in accordance with specification C. S. 1 and as shown on drawing C. A. 2658. All journals must be rolled. Ends of axles must be finished smooth.
<b>Bolsters.</b>	See schedule L 26a for parts. Simplex bolsters must be as shown on drawing C. A. 2809.
<b>Bolts, Column and Journal Box.</b>	Column bolts must be 1 $\frac{3}{4}$ " diameter by 25 $\frac{5}{16}$ " long, of wrought iron or open hearth steel, single nutted and keyed with $\frac{7}{8}$ " No. 14 steel split keys to pinch nuts as shown on drawing C. A. 3062. Journal box bolts must be 1 $\frac{1}{4}$ " diameter by 18 $\frac{7}{16}$ " long, of wrought iron or open hearth steel, single nutted and keyed with $\frac{7}{8}$ " No. 14 steel split keys to pinch nuts, as shown on drawing C. A. 3037.
<b>Brakes.</b>	See "Brake System."
<b>Truck Center Plates.</b>	See schedule L 26a. Truck center plates must be of cast steel annealed, in accordance with specification C. S. 14, M. C. B. contour, as shown on drawing C. A. 2795.
<b>King Bolts.</b>	King bolts must be of wrought iron or open hearth steel as shown on drawing C. A. 3332.
<b>Column Castings.</b>	Column castings must be of malleable iron, right and left patterns, each secured to spring plank by four $\frac{5}{8}$ " rivets. Holes must be reamed. Upper end of columns must be provided with lugs for brake beam hanger. Height of columns between arch bars must be 18". All dimensions involving fits must be accurate and as shown on drawing C. A. 3047.
<b>Journal Bearings.</b>	See schedule L 2 $\frac{1}{2}$ . Journal bearings must be M. C. B. standard, for journal 5 $\frac{1}{2}$ " diameter by 10" long, in accordance with specification C. S. 12 and as shown on drawing C. A. 2782. Journal bearings must be lined in accordance with section No. 3, specification C. S. 12. The initials of road must be cast in raised letters as indicated on drawing.
<b>Journal Bearing Wedges.</b>	Journal bearing wedges must be M. C. B. standard and made of cast steel, or drop forged steel, or malleable iron, as shown on drawings C. A. 3182 or C. A. 4486. Size of wedge must be cast or stamped upon each wedge.
<b>Journal Boxes.</b>	See schedule L. 13. Journal boxes must be cast to M. C. B. dimensions for a 5 $\frac{1}{2}$ " by 10" journal and made of malleable iron as shown on drawings C. A. 2993, C. A. 2994 and C. A. 2995.



# TENDER TRUCK.

Must be of arch bar type as shown on drawing C. A. 4325. Care must be exercised to see that all holes in arch bars, spring plates and column castings are drilled to templates to insure the arch bars and journal boxes being in perfect alignment when put together.

Wheel base..... 5'-6"  
Height top of rail to contact surface of center plate—tender loaded..... 23 1/2"  
Height top of rail to top of side bearing—tender loaded..... 31 1/2"

Arch bars must be of wrought iron, double reinforced, in accordance with specification C. S. 6 and as shown on drawing C. A. 3151.  
Top arch bars must be 1 1/2" x 5" section, see 5".  
Inverted arch bars must be 1 1/2" x 5" section, see 12".  
The bars must be 3/4" x 5" section.

Axles must be M. C. B. standard with 5 1/2" x 10" journals, made of open heart steel, in accordance with specification C. S. 1 and as shown on drawing C. A. 2858.  
All journals must be rolled.  
Ends of axles must be finished smooth.

See schedule I. 36a for parts.  
Simplex bolsters must be as shown on drawing C. A. 2809.

Column bolts must be 1 1/4" diameter by 25 1/2" long, of wrought iron or open heart steel, single nutted and keyed with 3/4" No. 14 steel split keys to punch nuts as shown on drawing C. A. 3002.  
Journal box bolts must be 1 1/4" diameter by 18 1/2" long, of wrought iron or open heart steel, single nutted and keyed with 3/4" No. 14 steel split keys to punch nuts, as shown on drawing C. A. 3037.

See "Brake System."

See schedule I. 36a.  
Truck center plates must be of cast steel annealed, in accordance with specification C. S. 14.  
M. C. B. contour, as shown on drawing C. A. 3795.

King bolts must be of wrought iron or open heart steel as shown on drawing C. A. 3322.  
Column castings must be of malleable iron, right and left patterns, each secured to spring plate by four 3/4" rivets.  
Holes must be reamed.  
Upper end of columns must be provided with lugs for brake beam hanger.  
Height of columns between arch bars must be 18".  
All dimensions involving fit must be accurate and as shown on drawing C. A. 3047.

See schedule I. 35.  
Journal bearings must be M. C. B. standard, for journal 5 1/2" diameter by 10" long, in accordance with specification C. S. 12 and as shown on drawing C. A. 3782.  
Journal bearings must be lined in accordance with section No. 3, specification C. S. 12.  
The initials of road must be cast in raised letters as indicated on drawing.

Journal bearing wedges must be M. C. B. standard and made of cast steel, or drop forged steel, or malleable iron, as shown on drawings C. A. 3182 or C. A. 4486.  
Size of wedges must be cast or stamped upon each wedge.

See schedule I. 12.  
Journal boxes must be cast to M. C. B. dimensions for a 5 1/2" by 10" journal and made of malleable iron as shown on drawings C. A. 2893, C. A. 2894 and C. A. 2895.

Design.

Dimensions.

Surveys.

Arch Bars.

Axles.

Bolsters.

Bolts,  
Column and  
Journal Box.

Brakes.

Truck  
Center Plates.

King Bolts.

Column  
Castings.

Journal  
Bearings.

Journal  
Bearing  
Wedges.

Journal  
Boxes.



**Dust Guards.**

Each journal box must be provided by the locomotive builder with a dust guard made of bass wood or poplar which must be covered with No. 4 white canvas duck tacked on with 6 oz. tacks; hole in center of canvas must be cut 3" in diameter and then cut radially at 12 equal points to a sufficient depth to permit canvas fitting axle snugly.

Each dust guard must be provided with inserts of .028 M. M. Gauge tin, as shown on drawing C. A. 3046.

**Springs.**

See schedule L 19½.

Elliptic springs must be made of the best quality of open hearth steel, in accordance with specification C. S. 17 and as shown on drawing C. A. 4299.

**Spring Planks.**

Spring planks must be 13" rolled steel channel weighing 31½ lbs. per ft. as shown on drawing C. A. 3183.

**Side Bearings.**

See schedule L 19.

Must be Miner Gravity Roller type 5" high, with auxiliary spring, as shown on drawing C. A. 2627.

Base castings of side bearings must be securely riveted by the bolster manufacturer, to bolster channel to exact centers as shown on drawing C. A. 2809.

Clearance between upper and lower side bearing must be ⅜" under light tender.

**Wheels.**

See schedule L 27½.

Wheels must be 33½" diameter over tires, with steel tires and cast iron double plate centers in accordance with drawing C. A. 2612 and specification C. S. 15.

Tires 3⅝" thick, 5½" wide, Master Mechanics' Association standard tread, held by shrinkage and retaining rings.

Wheels must be mounted on axle at a pressure of not less than 40 tons nor more than 60 tons.

## BRAKE SYSTEM.

**Air Brakes.**

See schedules L 1dd and L 1ee for air brake equipment details for road engine tender. *out.*

New York Air Brake Co's. Equipment must be applied.

Brake cylinder and reservoir must be properly supported from tender frame by suitable brackets as shown on drawings C. A. 4326 and C. A. 4331.

**Air Signal.**

See schedule L 2 for parts for passenger locomotives only.

New York Air Brake Company's air signal apparatus must be applied.

Piping must be in accordance with drawing C. A. 4377.

**Air Brake Pins.**

Air brake pins must be of open hearth steel, turned or drop forged to within ⅛" of sizes shown on drawing C. A. 3036 and secured by ⅜" cotter keys.

**Braking Power.**

Braking power must be 100% of the light weight of tender based upon an efficient air brake pressure of 60 pounds in air brake cylinder.

**Brake Beams and Attachments.**

See schedule L 4 for parts.

Brake beams must be 6" rolled steel I section, weighing 12.25 lbs. per foot, with forged steel fulcrums and malleable iron brake heads as shown on drawings C. A. 3032, C. A. 3033 and C. A. 3045.

Brake beam hangers must be ⅞" square iron, or open hearth steel, brought to ⅞" circular section to take brake headeye. Brake beam hangers must be supported from lugs on column castings and secured to same by 1⅞" wrought iron, or open hearth steel pin with ⅞" split key of No. 14 steel.

Brake beam safety chain at each end of beam, spaced 50" apart, must be secured to beam by a ¾" eye bolt and nut, end of bolt riveted over.



Dust Guards.

Spring  
Plants.

Side Bearings.

Wheels.

Air Brakes.

Air Signal.

Air Brake  
Pins.

Braking  
Power.

Brake Beams  
and  
Attachments.

Each journal box must be provided by the locomotive builder with a dust guard made of brass wood or poplar which must be covered with No. 1 white canvas duck tacked on with 8 oz. tacks; hole in center of canvas must be cut 8" in diameter and then cut radially at 12 equal points to a sufficient depth to permit canvas fitting axle snugly.

Each dust guard must be provided with inserts of .025 M. M. Gauge tin, as shown on drawing C. A. 3046.

See schedule I. 10 M.

Elliptic springs must be made of the best quality of open hearth steel, in accordance with specification C. S. 17 and as shown on drawing C. A. 4399.

Spring plants must be 1 1/2" rolled steel channel weighing 31 1/2 lbs. per ft. as shown on drawing C. A. 3183.

See schedule I. 12.

Must be Miller Gravity Roller type 5" high, with auxiliary spring, as shown on drawing C. A. 3627.

Base castings of side bearings must be securely riveted by the bolster manufacturer to bolster channel to exact centers as shown on drawing C. A. 3809.

Clearance between upper and lower side bearing must be 3/16" under light tender.

See schedule I. 27 1/2.

Wheels must be 38 1/2" diameter over tire, with steel tires and cast iron double plate centers in accordance with drawing C. A. 3612 and specification C. S. 15.

Tires 3 1/2" thick, 5 1/2" wide, Master Mechanics' Association standard tread, held by shrinkage and retaining rings.

Wheels must be mounted on axle at a pressure of not less than 40 tons nor more than 60 tons.

## BRAKE SYSTEM.

See schedules I. 141 and I. 142 for air brake equipment details for road engine tender.

New York Air Brake Co.'s Equipment must be applied.

Brake cylinder and reservoir must be properly supported from tender frame by suitable brackets as shown on drawings C. A. 4326 and C. A. 4331.

See schedule I. 2 for parts for passenger locomotives only.

New York Air Brake Company's air signal apparatus must be applied.

Piping must be in accordance with drawing C. A. 4377.

Air brake pins must be of open hearth steel, turned or drop forged to within 1/16" of sizes shown on drawing C. A. 3086 and secured by 3/4" cotter keys.

Braking power must be 100% of the light weight of tender based upon an efficient air brake pressure of 60 pounds in air brake cylinder.

See schedule I. 4 for parts.

Brake beams must be 8" rolled steel I section, weighing 13.25 lbs. per foot, with forged steel fulcrums and malleable iron brake heads as shown on drawings C. A. 3032, C. A. 3033 and C. A. 3045.

Brake beam hangers must be 1 1/2" square iron, or open hearth steel, brought to 3/8" circular section to take brake headways. Brake beam hangers must be supported from jugs on column castings and secured to same by 1 1/2" wrought iron, or open hearth steel pin with 3/4" split key or No. 14 steel.

Brake beam safety chain at each end of beam, spaced 50" apart, must be secured to beam by a 3/4" eye bolt and nut, end of bolt riveted over.



**Brake Levers and Supports.**

All holes for air brake pins must be drilled.

Brake levers must be of wrought iron or open hearth steel, live and dead levers alike, 24" long with leverages 6" and 18". Section at center  $3\frac{3}{4}" \times 1"$ , ends tapered to  $2\frac{1}{2}" \times 1"$ .

**Dead Lever Anchors.**

See schedule L 26a.

Dead lever anchors must be of malleable iron secured to bolster channel by two  $\frac{3}{4}"$  rivets as shown on drawing C. A. 2811.

**Brake Shoes.**

See schedule L 4 $\frac{1}{2}$ .

Brake shoes must be the M. C. B. Christie Flanged, Diamond "S" shoes with chilled ends, as shown on drawing C. A. 2628.

**Brake Shoe Keys.**

Shoes must be secured to heads with M. C. B. standard steel keys as shown on drawing C. A. 3035.

**Cylinder Brackets.**

Cylinder brackets must be made of  $\frac{1}{2}"$  wrought iron or open hearth steel, and secured to each sill, as shown on drawings C. A. 4326 and C. A. 4331.

**Hand Brake.**

In conjunction with the air brake, tender must be equipped with hand brake in accordance with drawing C. A. 4303.

**Hose, Air.**

See schedule L 1dd. *or L 1cc.*

Air hose must be  $1\frac{1}{4}"$  inside diameter, 22" long and in accordance with specification C. S. 5.

**Piping.**

Piping for tenders must be as shown on drawing C. A. 4377.

Train line must be  $1\frac{1}{4}"$  wrought iron pipe in accordance with specification C. S. 8.

End of train line pipe on rear must be located 18" from center line of tender, and  $34\frac{1}{2}"$  from top of rail and be provided with  $1\frac{1}{4}"$  angle cock as shown on drawing C. A. 3443. (See schedule L 1dd. *or L 1cc.*)

All piping must be well secured to tender frame by wrought iron or open hearth steel pipe clamps.

Red lead or white lead must not be used on pipe joints; plumbago may be used.

All piping must be well blown out with steam before application to tender.

Air brakes must be tested and all castings, pipes, joints and their connections must be free from leakage under an air pressure of 120 pounds.

**Piston Travel.**

Piston travel must not exceed  $7\frac{1}{2}"$  nor be less than  $5\frac{1}{2}"$  when brakes are adjusted.

## TENDER FRAME.

**Body Bolsters.**

Body bolsters must be in exact accordance with drawing C. A. 4331. Especial attention must be given to its construction.

The upper plates, two in number, must be wrought iron,  $\frac{5}{8}"$  thick by  $10\frac{1}{2}"$  wide.

The lower plates, two in number, must be wrought iron,  $\frac{5}{8}"$  thick by  $10\frac{1}{2}"$  wide, and reinforced by  $3" \times 3"$  angles.

The intermediate plates must be of wrought iron,  $\frac{5}{8}"$  thick by 21" wide.

To the center and side sills are riveted  $3" \times 3"$  angles.

The upper, lower and intermediate plates are riveted to the angles, which in turn are riveted to the sills.

**Body Center Plates.**

Body center plates must be of cast steel in accordance with specification C. S. 14 and as shown on drawing C. A. 4300.

Contour of center plate must be M. C. B. standard.

Wearing surface must be smooth.

Body center plate must be riveted to each center sill by eight  $\frac{7}{8}"$  rivets, as shown on drawings C. A. 4300 and C. A. 4331.



TEENDER FRAME.



**Body Side Bearings.**

Body side bearings must be of cast steel in accordance with specification C. S. 14, as shown on drawing C. A. 4301, and must be secured to intermediate and bottom plates of body bolsters with  $\frac{7}{8}$ " rivets, as shown on drawing C. A. 4331.

**Chafing Iron and Pocket.**

Chafing iron and pocket must be as shown on drawing C. A. 2783 and secured to tender frame as shown on drawing C. A. 4331.

The chafing iron at front of tender must be of cast iron with chilled face.

The chafing iron pocket must be of cast steel in accordance with specification C. S. 14.

**Buffer Springs.**

See schedule L 19 $\frac{1}{2}$ .

Buffer springs must be of open hearth steel in accordance with specification C. S. 17; 6 $\frac{1}{4}$ "x8", M. C. B. standard draft spring, as shown on drawing C. A. 2926.

**Frame.**

Frame must be substantially built of steel and thoroughly braced, as shown on drawing C. A. 4331.

Center sills must be 12" rolled steel, channel, weighing 40 lbs. per ft.

Side sills must be 12" rolled steel, channel, weighing 40 lbs. per ft.

Especial attention is directed to the method of securing sills together and to the end sill plates.

In addition to the bolster described above, the side sills must be secured to end sills by  $\frac{7}{8}$ " corner angle plate, using  $\frac{7}{8}$ " steel rivets, as shown on drawing C. A. 4331.

The corner angle plates must be secured by four 1" bolts and one  $\frac{7}{8}$ " rivet to the end sills.

The center sills must be riveted at the front with 1" steel rivets to the front drawhead as shown on drawing C. A. 4331.

At the rear the center sills must be riveted with 1" steel rivets to draw casting as shown on drawing C. A. 4331.

Midway between the body bolsters, the sills must be further secured together by a steel plate  $\frac{1}{2}$ " thick by 48" wide, riveted with 1" steel rivets, as shown on drawing C. A. 4331.

Diagonal braces  $\frac{1}{2}$ " x 10" must be securely riveted with 1" steel rivets to angles which are secured to sills, as shown on drawing C. A. 4331.

The tender frame will be further secured by four connection rods 1 $\frac{1}{2}$ " diameter with 1 $\frac{5}{8}$ " enlarged ends.

**Flooring.**

The flooring must be yellow pine, 2 $\frac{1}{2}$ " thick by 113" long, upon which the tank will rest.

The flooring must be secured to frame by  $\frac{1}{2}$ " bolts.

The ends of the flooring must be bound by 2 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ " angle iron, which must be secured by wood screws.

**Safety Appliances.**

The uncoupling rod or shaft of wrought iron or open hearth steel and secured on rear of tender must extend to both sides of the rear end of tender, as shown on drawings C. A. 4349.

The diameter of the rod must be 1"; the distance from under side of rod to top of bumper beam must not be less than 2 $\frac{1}{2}$ ".

The uncoupling rod must be held in position by two wrought iron brackets, as shown on drawing C. A. 4349.

Each bracket must be secured by one  $\frac{7}{8}$ " bolt, the head at the bottom and double nutted (nuts on top.)

The ends of the bolts must be riveted over.

**Steps.**

Steps must be of cast iron as shown on drawings C. A. 2813 and C. A. 4302 applied to the four corners of tender frame, as shown on drawing C. A. 4331.

**Timbers, End.**

End timbers must be of white oak, good quality, of the dimensions shown on drawing C. A. 4331.

**Tool Boxes.**

Two tool boxes as shown on drawing C. A. 3198, must be applied on top of tank on each side as shown on drawing C. A. 4351.

One tool box as shown on drawing C. A. 2885, must be applied on top of tank at the rear of coal board, as shown on drawing C. A. 4351.







## DRAFT GEAR.

### Coupler.

See schedule L 5.

Coupler must be the Climax, all steel M. C. B. in accordance with specification C. S. 21 and as shown on drawing C. A. 2630.

Coupler must be riveted to yoke with double refined iron rivets, as shown on drawing C. A. 3451.

Coupler yoke must be of wrought iron,  $1\frac{1}{4}" \times 4"$  section with 1" wrought iron filler block riveted to back end, as shown on drawing C. A. 3451.

### Draft Gear.

See schedule L 6, Miner Tandem Spring.

The drawbar stops, as shown on drawing C. A. 3053, must be securely riveted to draw casting, each by twelve 1" steel rivets as shown on drawing C. A. 4349.

A  $1\frac{3}{8}"$  double refined iron rivet must be used to secure malleable iron draft thimble to coupler yoke. *tie plate*

A  $\frac{1}{2}"$  steel ~~drawbar follower guide~~ must be bolted to the ~~bottom~~ *drawbar follower guides and* of draw casting by  $\frac{3}{4}"$  bolts as shown on drawing C. A. 4349.

### Draft Springs.

See schedule L 19 $\frac{1}{2}$ .

Draft springs must be  $6\frac{1}{4}" \times 8"$  M. C. B. standard in accordance with specification C. S. 17 and as shown on drawing C. A. 2926; two per tender.

It must not be necessary to compress draft springs to apply them in position.

### Follower Plates.

Follower plates must be of open hearth steel  $6\frac{1}{4}"$  wide  $\times 9\frac{3}{8}" \times 1\frac{1}{2}"$  with 2" round boss, 1" high, pressed up in center as shown on drawing C. A. 3642.

*Safety chain, M. C. B. standard, as shown on drawing C. A. 3632, must be applied to the rear of tender as shown on drawing C. A. 4349.*

## TANK AND FIXTURES.

### Tank.

Tank must have a capacity of 9000 gallons of water and 10 tons (20,000 lbs.) of coal.

Tank must be substantially built of steel plates in accordance with specification C. S. 3, and as shown on drawing C. A. 4328.

All seams must be single riveted with  $\frac{1}{2}"$  steel rivets, in accordance with specification C. S. 23, spaced  $1\frac{1}{2}"$  apart.

When tenders are equipped for oil burning, tank as per drawing C. A. 4540 must be applied.

Oil tank for tenders equipped for oil burning must be made as shown on drawing C. A. 4593 located in coal space of tank as shown on drawing C. A. 4594, and secured in the manner shown on drawing C. A. 4595.

### Hose, Tank.

See schedule L 8.

Tank hose must be Anaconda 3" tank, 48" long, with hose clamps, as shown on drawing C. A. 3054.

### Manhole and Cover.

Tank must be provided with a manhole as shown on drawing C. A. 4305 and located as shown on drawing C. A. 4328. *The finger on cover must be on front so that cover will remain closed when tank is in motion.*

### Securing Tank to Frame.

Tank must be secured to tender frame in the manner shown on drawings C. A. 4331 and C. A. 4328.

### Signal Lamp Brackets.

Signal lamp brackets must be of malleable iron as shown on drawing C. A. 3120 and located as shown on drawing C. A. 4586.

### Valves, Tank.

Tank valves and fixtures must be in accordance with drawing C. A. 4308.



THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY  
JANUARY 1954

TO THE HONORABLE CHAIRMAN OF THE BOARD OF TRUSTEES  
OF THE UNIVERSITY OF CHICAGO

FROM THE DEPARTMENT OF CHEMISTRY  
AND THE FACULTY OF THE UNIVERSITY OF CHICAGO

WE HEREBY CERTIFY THAT THE FOLLOWING  
IS A TRUE AND CORRECT COPY OF THE  
ORIGINAL AS SUBMITTED TO THE BOARD OF TRUSTEES

ON JANUARY 19, 1954

AT CHICAGO, ILLINOIS

WILLIAM B. JONES, Secretary  
JAMES H. HARRIS, Treasurer



## VESTIBULE.

### Diaphragm and Attachments.

See schedule L 26½.

Diaphragm and attachments must be the Acme, as shown on drawing C. A. 4310, and must be secured to diaphragm face plate with ¼" stove bolts.

The diaphragm attachments are for fastening the diaphragm to the vestibule frame. They are composed of a plate of flat iron bent to conform to the cover of the arch of the diaphragm. At the points where the arch of the diaphragm meet the straight legs or hinges, and from these points to the bottom of the legs are pieces of angle iron. The curved iron at the top is placed at the outer leaf of the diaphragm and screwed securely to the vestibule frame. This will hold the top of the diaphragm in place. The angle irons are hinged to the curved arch of iron on each side and then riveted to the legs of the diaphragm. The angle irons are then made fast to the vestibule frame by means of ¾" gimlet pointed lag screws with slotted heads, into which flat spring cotters or keys are inserted, making a substantial fastening, easily opened and again replaced. The diaphragm is then in place for service. Across the top of the diaphragm must be riveted the piece of extra heavy duck, furnished.

### Framing.

Vestibule framing must be in exact accordance with drawing C. A. 4350.

### Piston Rods And Springs.

Diaphragm must be provided with piston rods and springs as shown on drawing C. A. 4350.

## PAINTING, LETTERING AND NUMBERING.

### Application.

All paint colors must be furnished by the locomotive builder and must conform in shade with sample colors shown on schedule L 16½. Samples of colors, with the exception of aluminum leaf, will be furnished by the Railroad Company.

All paints mentioned in specification C. S. 22 must conform with that specification.

All paints must be applied with brushes in perfectly even coats to both wood and metal surfaces in a workmanlike manner.

Inspectors will see that paints are not thinned down beyond their specified consistency to permit of more rapid application.

The use of benzine, or other inferior cutting agencies, will not be permitted.

The time allowed for drying must not be shortened.

If from atmospheric or other conditions the colors or varnish do not properly dry in the time given, it is understood that the work must not proceed until they are properly dried.

### Steel and Iron Parts.

All steel and iron parts must be thoroughly cleaned, free from rust, scale and grease.

To prevent preliminary oxidation, apply immediately one coat of metallic paint, color C. S. 11, reduced with turpentine and japan, to all parts which are to be painted, which have not already received a priming coat, and to under side of boiler jacket and inside of tender tank, but not to the following, viz : Brake rigging, cocks, valves and other brass details, hand rails, pipe (iron and copper), running boards and brackets.

### Parts of Engine and Tender which Are to be Varnished.

The parts of engine and tender which are to be varnished, such as outside of cab (except roof), cylinder head casings, cylinder saddle, dome, safety valve casing, sand boxes, driving wheels, outside of tender tank, etc., apply one coat of locomotive primer and allow 24 hours for drying. Then putty.

Apply three coats of locomotive surfacer, the first coat to be applied with a knife, the second and third coats with a brush, and allow 12 hours for drying after each coat.

Rub with pumice stone and water.

Apply two coats of drop black color C. S. 14, and allow 8 hours for drying after each coat.



Page 1

Page 2

Page 3

Page 4

Page 5

Page 6



**Lettering and  
Numbering.**

Letter and number in aluminum leaf, C. S. 16.

Name and initials of Railroad Company and the number of locomotive must be in accordance with special instructions, which will be furnished.

Style and location of all lettering and numbering must be in accordance with drawing C. A. 3867 and C. A. 4587, and drawings indicated thereon.

Name of road in three-inch Roman letters as shown on drawings C. A. 3879 and C. A. 3880 must be indicated in full on each side of cab. On locomotives where the name of the road is too long to permit its being shown in full, the initials of such road are to be indicated in six-inch Roman letters as shown on drawings C. A. 3874, C. A. 3875, C. A. 3876, C. A. 3877 and C. A. 3878 on each side of cab.

The initials of road in six-inch Roman letters as shown on drawings C. A. 3874, C. A. 3875, C. A. 3876, C. A. 3877 and C. A. 3878 must be indicated on sides of tank.

The number of locomotive must appear on the following parts, viz:

Both sides of sand box, in six-inch metal figures, as shown on drawings C. A. 3872 and C. A. 3873.

Front and sides of headlight glass in three-inch Roman figures as shown on drawing C. A. 3881.

Front number plate in four-inch aluminum figures as shown on drawing C. A. 4463.

Both sides of tank in fifteen-inch Roman figures as shown on drawings C. A. 3883, C. A. 3884, C. A. 3885, C. A. 3886, C. A. 3887, C. A. 3888, C. A. 3889 and C. A. 3890.

Both sides on rear of tank as shown on drawing C. A. 4587.

Water capacity of tank must be indicated on rear of tank in two-inch Roman letters and figures as shown on drawing C. A. 3882.

The initials of Railroad Company and number of locomotive must be indicated in white lead in two and three-quarters-inch Roman letters and figures on side of each truck bolster which faces center of tender.

**Class  
Designation.**

The class designation of locomotives must be indicated on each side of cab in one and one-eighth and two-inch letters and figures as shown on drawings C. A. 3937 and C. A. 3882.

Apply two coats of locomotive finishing varnish and allow 24 hours for drying and 12 hours before shipping.

**Parts of  
Locomotive  
Which are  
Not to be  
Varnished.**

The parts named below, and such other iron and steel parts as are not otherwise specified, must receive one coat of locomotive black varnish color C. S. 7, viz:

Boiler front,	Smoke box,
Brake rigging,	Smoke stack,
Channels of main and side rods,	Steps,
Engine frames,	Bottom of tender tank,
Engine truck except axles,	Tender frame,
Hand rails,	Tender trucks except axles,
Iron rods,	Tool boxes.
Pipes.	

**Cab.**

In addition to the coat of metallic paint, C. S. 11 specified, the cab must be painted as follows:

The outside of cab roof must receive two coats of roof color C. S. 3.

Allow 36 hours for drying after each coat.

The interior of cab, and all cab seat boxes must receive one coat of locomotive primer.

Allow 48 hours for drying.

After 24 hours, putty.

Apply one coat of green color C. S. 15.

Finish with one coat of locomotive rubbing varnish.

Window sashes and doors must receive one coat of hardwood filler and two coats of locomotive rubbing varnish.

Allow 24 hours for drying after each coat.

**General.**

For locomotive primer, locomotive surfacer, paints and varnishes, brands of only such manufacturers as may be approved by the Railroad Company, may be used.

~~July 10, 1905.~~

July 1-1906



Lettering and  
Numbering

Letter and number in aluminum leaf, C. S. 18.  
Name and initials of Railroad Company and the number of locomotive must be in accordance  
with special instructions, which will be furnished.  
Style and location of all lettering and numbering must be in accordance with drawing  
C. A. 3887 and C. A. 4887, and drawings indicated thereon.  
Name of road in three-inch Roman letters as shown on drawings C. A. 3879 and C. A. 3880  
must be indicated in full on each side of cap. On locomotives where the name of the road is too  
long to permit its being shown in full, the initials of such road are to be indicated in six-inch Roman  
letters as shown on drawings C. A. 3874, C. A. 3875, C. A. 3876, C. A. 3877 and C. A. 3878  
on each side of cap.

The initials of road in six-inch Roman letters as shown on drawings C. A. 3874, C. A. 3875,  
C. A. 3876, C. A. 3877 and C. A. 3878 must be indicated on sides of tank.  
The number of locomotive must appear on the following parts, viz:  
Both sides of and box in six-inch letters as shown on drawings C. A. 3872 and C. A. 3873.  
Front and sides of headlight glass in three-inch Roman figures as shown on drawing C. A. 3881.  
Front number plate in four-inch aluminum figures as shown on drawing C. A. 4483.  
Both sides of tank in three-inch Roman figures as shown on drawings C. A. 3888, C. A.  
3889, C. A. 3890, C. A. 3891, C. A. 3892, C. A. 3893 and C. A. 3894.  
Both sides of tank as shown on drawing C. A. 4587.  
Water capacity of tank must be indicated on rear of tank in two-inch Roman letters and figures  
as shown on drawing C. A. 3882.  
The initials of Railroad Company and number of locomotive must be indicated in white lead in  
two and three-quarters-inch Roman letters and figures on side of each tank boiler which faces  
center of tender.

Class  
Designation

The class designation of locomotives must be indicated on each side of cap in one and one-  
eighth and two inch letters and figures as shown on drawings C. A. 3887 and C. A. 3888.  
Apply two coats of locomotive finishing varnish and allow 24 hours for drying and 12 hours  
before shipping.

Parts of  
Locomotive  
Which are  
Not to be  
Varnished.

The parts named below, and such other iron and steel parts as are not otherwise specified,  
must receive one coat of locomotive black varnish color C. S. 7, viz:  
Boiler front,  
Brake rigging,  
Chassis of main and side rods,  
Engine frames,  
Exhaust truck except axles,  
Hand rails,  
Iron rods,  
Pipes,  
Tender trucks except axles,  
Tender frame,  
Bottom of tender tank,  
Steps,  
Smoke stack,  
Smoke box,  
Tool boxes.

Cap

In addition to the coat of metallic paint C. S. 11 specified, the cap must be painted as follows:  
The outside of cap roof must receive two coats of roof color C. S. 8.  
Allow 36 hours for drying after each coat.  
The interior of cap, and all cap seat boxes must receive one coat of locomotive primer.  
Allow 48 hours for drying.  
After 24 hours, putty.  
Apply one coat of green color C. S. 1A.  
Finish with one coat of locomotive rubbing varnish.  
Window sashes and doors must receive one coat of hardwood filler and two coats of  
locomotive rubbing varnish.  
Allow 24 hours for drying after each coat.

General

For locomotive primer, locomotive surfacer, paints and varnishes, brands of only such  
manufacturers as may be approved by the Railroad Company, may be used.

July 19, 1905.



